

CLAIMS

1. A temperature control system for a workpiece chuck comprising:
 - a fluid circulation system for circulating a temperature control fluid through the workpiece chuck; and
 - 5 a fluid recovery system coupled to the fluid circulation system for recovering a portion of the temperature control fluid from the fluid circulation system, the fluid recovery system comprising:
 - a gas inlet for allowing gas to be forced into the fluid circulation system and circulated through the fluid circulation system to carry the
 - 10 portion of the temperature control fluid through the fluid circulation system, and
 - an outlet connected to a reservoir, the reservoir receiving from the outlet the gas circulated through the fluid circulation system and the portion of the temperature control fluid.
- 15 2. The temperature control system of claim 1, wherein the temperature control fluid comprises a hydrofluoroether (HFE).
3. The temperature control system of claim 1, wherein the temperature control fluid comprises methoxy-nonafluorobutane (C₄F₉OCH₃).
4. The temperature control system of claim 1, wherein the gas forced through the
- 20 fluid circulation system is air.
5. The temperature control system of claim 1, wherein the fluid recovery system further comprises a heat exchanger for receiving displaced gas and vapor of the temperature control fluid from the reservoir to condense the vapor.

6. The temperature control system of claim 5, wherein the fluid recovery system further comprises a separator for receiving gas and condensed temperature control fluid from the heat exchanger and separating the gas and the condensed temperature control fluid.

5 7. The temperature control system of claim 6, wherein the fluid recovery system further comprises a fluid line for carrying the condensed temperature control fluid from the separator to the reservoir.

8. The temperature control system of claim 6, wherein the fluid recovery system further comprises a gas line for venting separated gas from the separator to the atmosphere.

10 9. A method for controlling temperature in a workpiece chuck comprising:
providing a circulation system for circulating a temperature control fluid through the workpiece chuck; and
coupling a fluid recovery system to the fluid circulation system for recovering a portion of the temperature control fluid from the fluid circulation system;
15 circulating a gas through the fluid circulation system to carry the portion of the temperature control fluid through the fluid circulation system; and
routing to a reservoir the gas circulated through the fluid circulation system and the portion of the temperature control fluid.

10. The method of claim 9, wherein the temperature control fluid comprises a hydrofluoroether (HFE).

11. The method of claim 9, wherein the temperature control fluid comprises methoxy-nonafluorobutane (C4F9OCH3).

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12. The method of claim 9, wherein the gas forced through the fluid circulation system is air.
13. The method of claim 9, further comprising routing displaced gas and vapor of the temperature control fluid to a heat exchanger to condense the vapor.
- 5 14. The method of claim 13, further comprising routing gas and condensed temperature control fluid from the heat exchanger to a separator, the separator receiving and separating the gas and the condensed temperature control fluid.
15. The method of claim 14, further comprising routing the condensed temperature control fluid from the separator to the reservoir.
- 10 16. The method of claim 14, further comprising venting separated gas from the separator to the atmosphere.